




Central Vermont Public Service

Energizing Vermont for
75 YEARS





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AgSTAR National Conference

The Madison Concourse Hotel

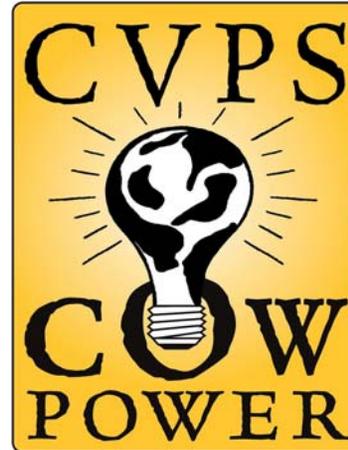
Madison, Wisconsin

April 25-26, 2006



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Diversifying Vermont Farms through Renewable Generation

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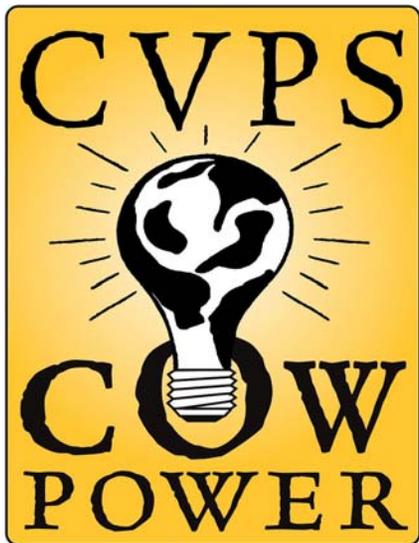


.....www.cvps.com



CVPS Cow Power™

A renewable energy program directly linking farm based renewable energy produced from agricultural waste with retail electric customer choice.



- Provides customers a renewable choice.
- Provides Vermont dairy farmers with a new revenue stream and new manure management options.
- Provides Vermont with new tool to protect the environment.



Central Vermont Public Service developed a two-pronged strategy and created a new economic model for a sustainable renewable energy supply:

• **The CVPS Renewable Development Fund**

• This fund provides farmers with financial incentives to produce a clean energy supply through anaerobic digestion of agricultural products, bi-products or waste.

• **The CVPS Cow Power™ Tariff**

• The Tariff offers CV customers a renewable option so they can “choose” energy generated by Vermont farms.





CVPS Renewable Development Fund :

- CVPS created the Fund with an initial deposit of approximately **\$846,000** received in 2003 and 2004 from an insurance credit (NEIL) resulting from the sale of the Vermont Yankee nuclear power plant.
- The 2005 credit was **\$480,000**.
- The 2006 credit will be **\$475,000**.





CVPS Renewable Development Fund (Continued)

- **\$560,000** from the Fund was donated to further the goals of Vermont's **Solar and Small Wind Incentive Program** at VEIC in Burlington.
- The balance of the Fund **\$1,220,000** is being used to help farms develop new CVPS Cow Power™ projects.
- \$20,000 from 2005 is being used by CVPS to market the Cow Power™ tariff to new customers.





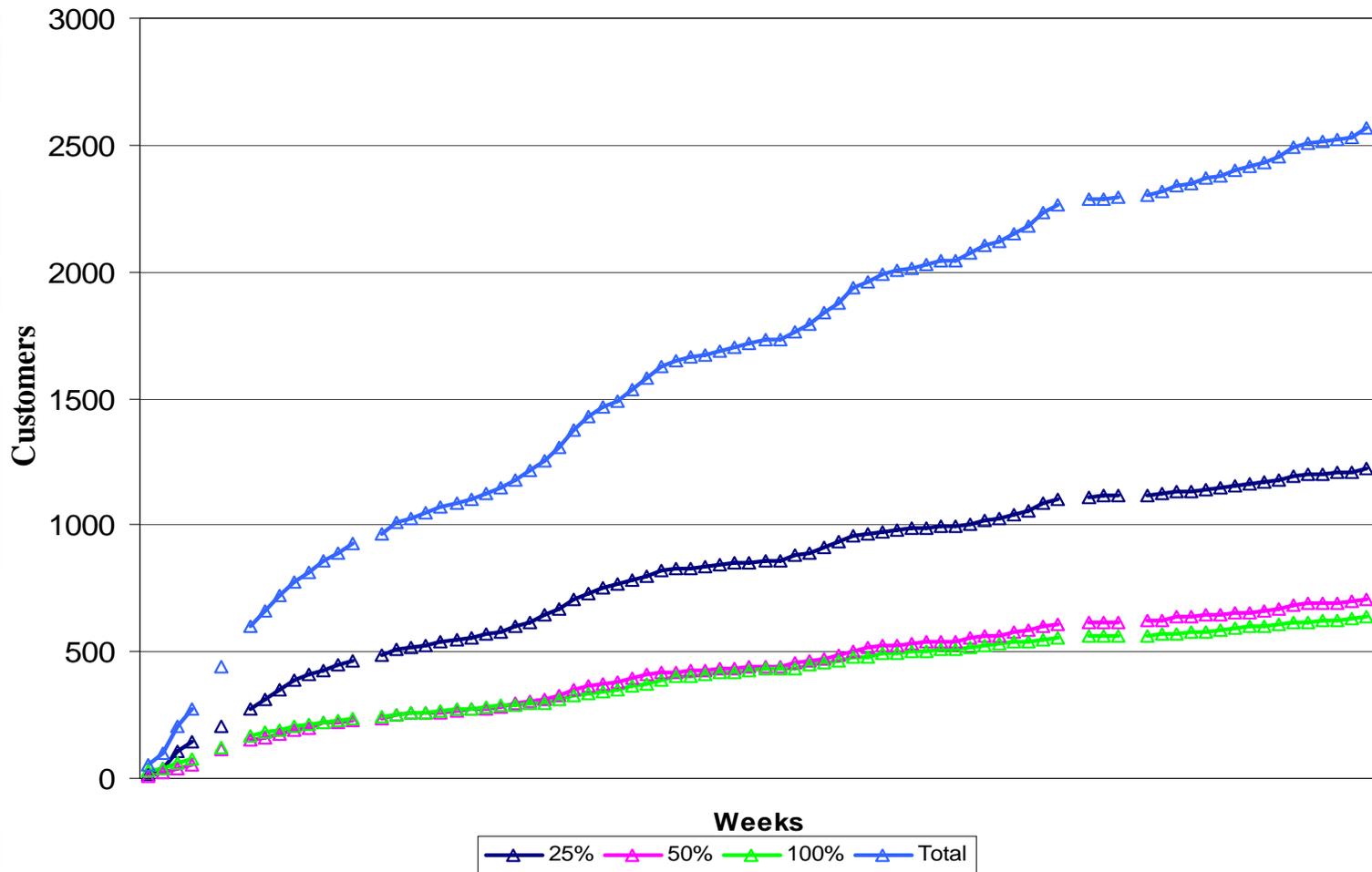
CVPS Cow Power™ Tariff

- CVPS purchases electric output at 95% of the Locational Marginal Price (LMP).
- CVPS retail customers purchase **all** renewable attributes (RECs, carbon credits, etc.) from farm generators.
- To date, over 2,500 customers choose Cow Power™ paying a \$0.04/kWh premium on their electric bill for these renewable attributes (4,800 MWh in 2005).
- 100% of the premium payment goes to the farm
- Retail customers can choose 100%, 50% or 25% of their electricity under the new Tariff.





CVPS Cow Power™ Tariff Participants





Why focus on animal waste?

- The air and water-quality issues associated with animal waste management can be significant. The dairy industry in New York and Vermont and the swine industry in Quebec have an affect on Lake Champlain.
- Anaerobic treatment of waste can significantly reduce odor and certain water quality impacts.
- Methane from liquid manure storage is otherwise released into the atmosphere. Methane is a greenhouse gas ~21 times more effective than Carbon Dioxide at trapping heat.
- Farm generators are likely to raise few concerns from neighbors. These generators integrate well into the farm landscape.



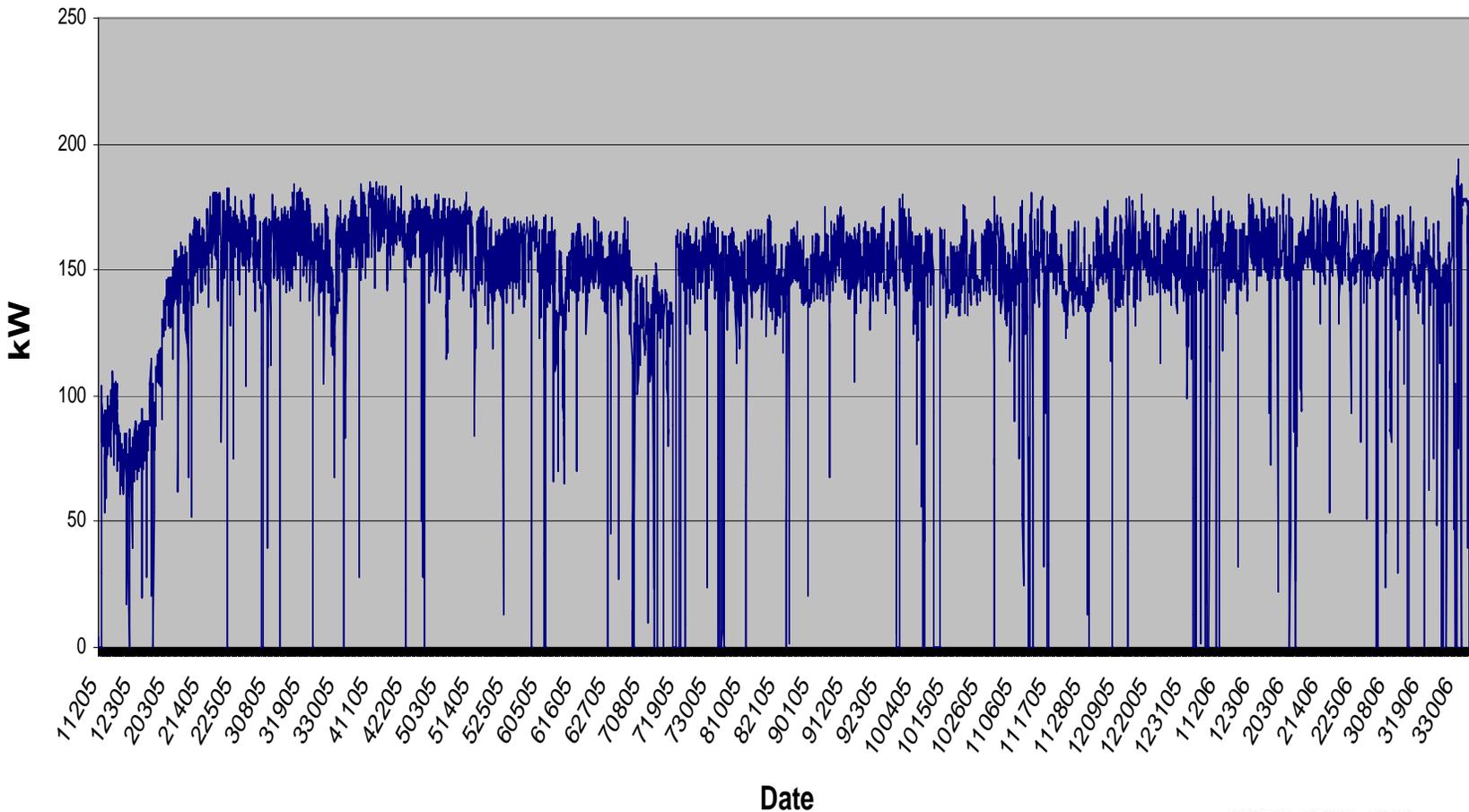
Benefits to Farmers

- Provides a new revenue stream, improving farm profitability while preserving a working landscape. (2005 average over **\$0.072/kWh** through December 2005 plus **\$0.04/kWh** premium)
- Use of digested solids as a replacement for purchased animal bedding (estimated savings **\$60,000** per year)
- Waste Heat offsets fuel costs for hot water needs in dairy. (Annual fuel oil bill in 2005 dropped **\$15,000**)
- Significant Grants available in Vermont from USDA Rural Development, CVPS Renewable Development Fund, BMP etc).





Audet's Cow Power LLC January 2005 to April 2006





Environmental Benefits

- Increases reliance on new, local renewable energy production.
- Carbon dioxide is plant-based not coal, gas or oil.
- Reduces the biochemical oxygen demand (BOD) of digested animal waste. Somewhat reducing the danger for aquatic animals in the event of unexpected runoff.
- Reduces farm release of methane, a greenhouse gas.





Environmental Benefits (Continued)

The reduced methane emissions on Blue Spruce Farm produce an annual environmental benefit equivalent to removing 3,500 metric tons of carbon dioxide from the air. Equal to 18 rail cars of coal not burned or a 2,900 acre pine forest's ability to absorb CO₂.





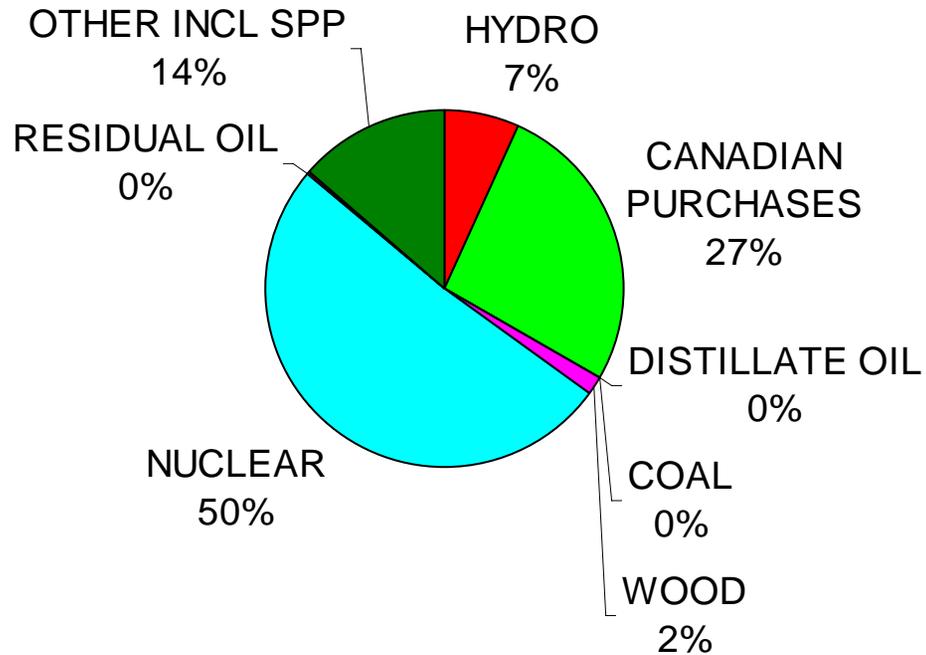
Environmental Benefits (Continued)

- With reduced odor, farms spread liquid manure when soil uptake is the greatest in warm, dry weather without offending neighbors.
- Liquid manure can be spread on growing crops without burning, incorporating nutrients into the growing plants faster reducing potential nutrient run-off concerns.
- Farms located in the Lake Champlain watershed may be able to reduce their impact on the Lake's water quality by effectively removing some phosphorous with manure solids separation and sale off the farm.





SOURCES AS A PERCENT OF SYSTEM OUTPUT Consolidated-YTD Through December 2005





Electric System Benefits

- CVPS gained tremendous knowledge about the interconnection and system protection of remote generation on a rural distribution system.
- First time in Vermont retail customers can influence power supply choices by voting for Cow Power™.
- Cow Power™ generation units operate at high capacity factor (> 77%) adding reliability and diversity to the power supply. Blue Spruce has been on-line 97% since January 2005.





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CVPS Cow Power

- Current economics dictate larger farms 500+
- Different AD Technologies
 - Flex cover (RCM)
 - Concrete cover (GHD)
 - Danish design above ground tanks (Microgy)
 - German design below ground tanks (Wackerbauer)
 - Experimental at Hinsdale and Whitcomb
- Future trend to smaller farms (200)
 - Incorporate crops or other waste at farm
 - Potential to use gas only for water heating/boiler





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